

REMARKS

Claims 1-18 are pending in this application, and in the Office Action, the Examiner issued a final rejection of all of these claims under 35 U.S.C. §102 as being fully anticipated by U.S. Patent 6,251,745 (Yu).

Applicants herein request that independent Claims 1, 8 and 15 be amended to emphasize differences between the claims and the prior art. Applicants also ask that claims 5-7, 11-14 and 16-18 be amended to keep the language of these claims consistent with the language of the amended Claims 1, 8 and 15 respectively.

For the reasons discussed below, the rejection of Claims 1-18 is respectfully traversed, and the Examiner is asked to enter this Amendment and to reconsider and to withdraw the rejection of, and to allow, Claims 1-18.

As discussed in Applicants' previous Amendment, both the present invention and Yu generally relate to photolithography, and both this invention and Yu involve overlay offsets that occur during photolithography. There are, though, a number of important differences between the present invention and the procedure disclosed in Yu. One important difference is that Yu is directed to measuring the overlay offset, while the present invention is directed to determining a proper overlay offset tolerance.

In Yu, once the offset is measured, those measurements may be used, first, to adjust the photolithography tool to decrease the offset, and second, to center the pattern that has a zero offset. In this invention, in contrast, overlay offset is varied across the wafer, and functional yield data is obtained to identify the acceptable offset tolerance.

More specifically, this invention determines the effect of critical dimension (CD) on overlay tolerance. As explained in greater detail in the present application, overlay tolerance is a function of image size. In particular, increasing the critical dimension reduces the overlay tolerance, while decreasing critical dimension increases the overlay tolerance.

In accordance with this invention, the effect of critical dimension on overlay tolerance is determined by exposing the wafer at different critical dimensions and varying the overlay offset across the wafer, for example, by intentionally increasing the magnification. The wafer will exhibit a region of good chips transitioning to a region of bad chips, and the overlay offset at which the bad region begins can be considered the limit for that particular image size.

Yu does not disclose or suggest determining an acceptable overlay tolerance by exposing the wafer at different critical dimensions thereby to form varying overlay offsets across the wafer, and then using those varying overlay offsets to identify the desired overlay tolerance.

Applicants herein ask that Claims 1, 8 and 15 be amended to emphasize the above-discussed difference between this invention and the prior art. In particular, claim 1 is being amended herein to indicate that the photolithography process set forth in the claim includes the steps of exposing the wafer at different critical dimensions, and varying the associated overlay offset across the wafer. Claim 1 also includes the step of using functional yield data from the wafer to determine an acceptable overlay tolerance. Claim 8, similarly, is being amended to indicate that the photolithography apparatus set forth in the claim includes means for exposing the wafer at different critical dimensions, and means for varying the associated overlay offset across the wafer. This claim, like Claim 1, also includes the feature that functional yield data from the wafer is used to determine an acceptable overlay tolerance.

Claim 15 is directed to a method of determining an acceptable overlay tolerance in a photolithography process. This Claim presently includes the step of varying the overlay offset across each wafer, and the Claim is being amended herein to include also the step of exposing the wafer at different critical dimensions.

The other references of record have been reviewed and these references, whether they are considered individually or in combination, are believed to be no more pertinent than Yu.

Because of the above-discussed differences between Claims 1, 8 and 15, as amended herein, and the prior art, and because of the advantages associated with those differences, these claims patentably distinguish over the prior art and are allowable. Claims 2-7 are dependent from Claim 1 and are allowable therewith. Likewise, Claims 10-14 are dependent from, and are allowable with, Claim 9; and Claims 16-18 are dependent from Claim 15 and are allowable therewith.

Applicants note that the change requested herein to Claims 1, 8 and 15 only emphasize differences between these claims and the prior art. For example, Claim 1 presently sets forth a photolithography process, and Applicants ask that this process be describe in more detail. Similarly, Claim 8 currently sets forth a photolithography apparatus and Applicants ask that the claim be amended to include additional features of this apparatus. Also, the requested changes to Claims 5-7, 11-13 and 16-18 are in the nature of editorial changes to keep the specific terminology used in these claims consistent with the terminology used in the respective independent claims.

Accordingly, it is believed that entry of this Amendment is appropriate, and such entry is respectfully requested.

Every effort has been made to place this application in condition for allowance. For the reasons discussed above, the Examiner is asked to enter this Amendment, to reconsider and to withdraw the rejection of Claims 1-18 under 35 U.S.C. §112, and to allow these claims. If the Examiner believes that a telephone conference with Applicants' Attorneys would be advantageous to the disposition of this case, the Examiner is asked to telephone the undersigned.

Respectfully Submitted,

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